had their appointed places in which they were always to be found. This habit of order made him an admirable collector, and I well remember, on visiting Kew after my return from the Amazon, the late Sir William Hooker took out some bundles of plants collected by Dr. Spruce and pointed out to me how well chosen and beautifully preserved they were, notwithstanding that they had been collected in one of the very moistest climates in the world, in which the care and labour required to produce such a result was very great. He was quick at languages; spoke and wrote French with ease; and in South America rapidly acquired the Portuguese and Spanish languages, for the latter of which he had a great admiration. He had literary tastes, and was fond of the old poets; he was full of anecdote, and even when suffering from illness an hour would rarely pass without some humorous remark or pleasant recollection of old times. He was an advanced Liberal in politics, a true lover of the working classes, and nothing more excited his indignant wrath than to hear of the petty, but cruel, persecutions to which they are often subjected. In all his words and ways he was a perfect gentleman, and to possess his personal friendship was a privilege and a pleasure.

Of his merits as a botanist it must be left to experts to speak; but his writings show that he had great powers of observation, and that nothing escaped him that could throw light on the peculiarities of the grand and luxuriant vegetation among which the best years of his life were passed. His papers and letters sufficiently prove that he possessed a clear and picturesque style of writing, and it is to be hoped that the journals kept during his fifteen years' exploration, which he was himself unable to prepare for publication but which must be full of interesting matter, may soon be given to the world. His sole executor is his old friend and neighbour, Mr. Matthew B. Slater, of Malton.

A. R. W.

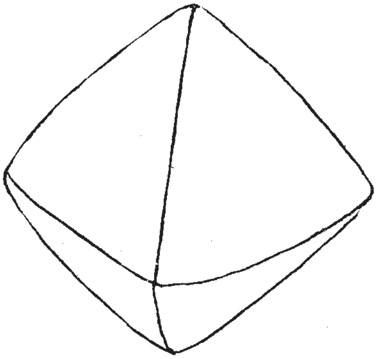
PRECIOUS STONES.

ONLY twenty-five years have elapsed since the existence of diamonds in South Africa was first made known, and during that period the diamond trade of the world has undergone a complete revolution. The working of diamond gravels in Brazil has been almost entirely abandoned, while the search for the gem in India, Borneo, and other districts has been seriously discouraged. The export of rough diamonds from South Africa rose gradually from 200 carats in 1867–68 to 3,841,937 carats in 1888, when it attained a maximum: since that date, however, there has been a slight decline in the output of the mines. The annual value of the diamonds raised in South Africa now exceeds £4,000,000. Strange to say, the discovery of the new and abundant source of diamonds has not had any serious effect in diminishing the market value of the gem. When the diamond was first discovered in South Africa, the estimated value per carat of the rough stones was about £1 10*s.*; in 1890 the price had risen to £1 13*s.* 3*d.*, and last year it declined to £1 5*s.* 8*d.*

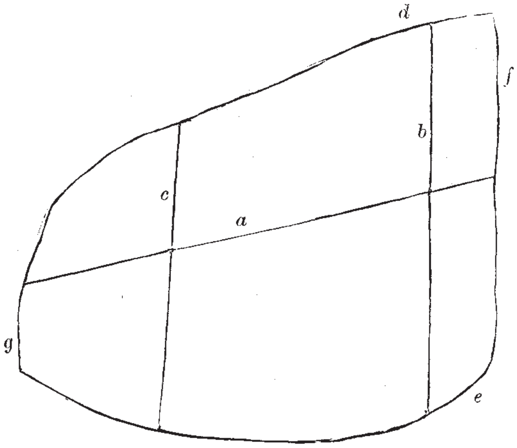
The foregoing particulars are taken from a recently published book which gives an admirable account of the origin of the diamond industry in South Africa, and of the successive changes made in the method of mining and washing the "blue-earth" which yields the gems.[1] This work originally appeared as a guide to the Kimberley exhibition of 1892, and contains so much valuable information in a small compass, that the author has been well-advised in issuing it in its present more permanent form.

The working of the celebrated mines about Kimberley was commenced by adventurers working independently in their claims. But as the mining was carried to greater and greater depths, combined action became necessary, and gradually the claims were amalgamated and bought up by large companies.

Up to the year 1872 the working of the claims in the South African mines was carried on by a system of roadways, which were laid out when the concessions were first granted. About the date named, the use of these roads had to be abandoned in favour of a system of haulage by wire ropes—these making a network over the whole of the mines. The appearance of the mines under these two systems of working is admirably illustrated by photographs in the work before us. By the year 1884, the mine at Kimberley having been carried to a depth of 400 feet, and heavy falls of material having produced serious loss and inconvenience, it was felt that the time had come for carrying out a totally different system of mining there. Accordingly, in that year, inclined shafts, starting from the surface, outside the limits of the mine, were put down, and these inclined shafts have been since superseded by vertical ones.



Exact size and shape of a diamond found in the De Beers Mine, and exhibited at the Paris Exposition, 1889. Weight, before cutting, 428½ carats, after cutting, 228½ carats.



Diamond found in Jagersfontein Mine in June 1893. Length (*a*) 2½ in.; greatest width (*b*) 2 in.; smallest width (*c*) 1½ in. Thickness at (*b*) end 1¼ in.; thickness at (*c*) end ⅞ in. Extreme girth in width (taken from *e* to *d*) 5⅜ in. Extreme girth in length (taken from *f* to *g*) 6¾ in. Gross weight 969½ carats.

The changes in the working of the Kimberley Mine have been followed by similar alterations in the nature of the operations carried on in the three other great mines in its immediate neighbourhood—De Beers, Bultfontein, and Dutoitspan. These four mines are in the vicinity of the townships of Kimberley and Beaconsfield in the British colony of Griqualand West. The only other im-

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[1] "Diamonds and Gold in South Africa." By Theodore Reunert, M.Inst.M.E., Assoc.M.Inst.C.E., with Maps and Illustrations. (London: E. Stanford; and Capetown, Port Elizabeth, and Johannesburg: J. C. Juta and Co., 1893.)

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portant diamond mine in South Africa is that of Jagersfontein, situated in the Orange Free State, about eighty miles to the south-east of Kimberley.

The diamond mines of South Africa are not less remarkable for the size of the individual stones that they have yielded, than for the vast amount of the precious material with which they have flooded the markets of the world. The "Braganza" diamond, which belonged to the Emperor of Brazil, is said to weigh 1680 carats, but it has never been subjected to the inspection of experts, and there is every reason to believe that it is nothing but a colourless topaz. In the same way the reputed diamond of the Rajah of Matan in Borneo (367 carats) has been recently shown to be only a piece of quartz. The "Great Mogul," the Regent or Pitt diamond, and the Koh-i-nûr, the finest productions of the Indian mines, are said to have originally weighed $787\frac{1}{2}$, 410, and 193 carats respectively, but were reduced by cutting to $279\frac{7}{16}$, $136\frac{7}{8}$, and $102\frac{3}{4}$ carats. The Brazilian mines have yielded the Portuguese Regent and the Star of the South, the former of which, on cutting, yielding a gem of 215 carats, while the latter weighed $254\frac{1}{2}$ carats in the rough.

The South African mines have, however, produced stones surpassing in size all those hitherto obtained either from India or Brazil. Some of these stones are, it is true, of a yellow colour, and therefore of comparatively small value; but others, like the Porter-Rhodes diamond (150 carats), the De Beers diamond ($428\frac{1}{2}$ carats), and the Jagersfontein diamond ($969\frac{1}{2}$ carats)—the last-mentioned having been discovered as recently as June 30, 1893—are remarkable for their freedom from any trace of yellow tint, and for the perfect whiteness or even blue-whiteness of their colour. We are able to give outlines drawn to the true scale of the two largest South African diamonds, the one characterised by its crystalline form (a regular octahedron), the other by its irregularity of shape. These are taken from Mr. Reunert's book.

Another book on precious stones that has recently appeared is of a very different character, and deals not only with the diamond, but with all the other materials held in esteem by jewellers.[1] The two works are, however, equally entitled to praise for the accuracy and fulness of the information they supply, and for the manner in which the latest sources of information have been utilised.

The distinguishing feature of Dr. Doelter's book upon precious and ornamental stones is the care which has been bestowed upon the directions for their easy and certain discrimination. In the earlier chapters, the descriptions of the various methods for determining and accurately defining the specific gravity, cleavage, hardness, refractive index and double refraction, as well as the colour, pleochroism, and absorption of minerals, are very full and entirely satisfactory. The second part of the work contains systematic descriptions of the minerals employed for purposes of ornament; and these, as might be expected from a mineralogist of Dr. Doelter's position, leave nothing to be desired in the way of completeness and accuracy. No less admirable are the accounts given of the artificial production of these minerals, of the materials made to imitate them, and of the value of gems and the modes of cutting them. Details of this kind are of much practical value, and add greatly to the usefulness of the book as a work of reference. The position of certain minerals in the estimation of jewellers is liable to variation as the popular taste changes, and it is certainly not the same in different countries. Dr. Doelter's classification will, however, we think be generally accepted as a judicious one. Of precious stones proper he admits three classes, in the highest of which he places only the diamond, the various forms of corundum, the emerald, and the spinel, though possible exception may be taken to the high position allowed to the last of these. The second-class contains euclase, chrysoberyll, zircon, phenacite, topaz, the noble opal, garnet and tourmaline. To the third class are relegated the turquoise, olivine, cordierite, kyanite, andalusite, staurolite, hiddenite, axinite, vesuvian, and diopside. The "semi-noble stones" fall into two classes, in the higher of which are placed quartz, chalcedony, agate, felspars, lapis lazuli, and rhodonite, while the lower contains amber, fluorspar, nephrite, agalmatolite, malachite, and serpentine. It is doubtful whether some of the forms of quartz, like amethyst and cat's-eye, are not deserving of a place among the noble stones proper.

The third part of the work contains a series of tables for the determination of the minerals which are employed as precious stones. These tables have been drawn up with great care, and cannot fail to prove of very great service to those studying gems and similar materials, either from the scientific or the commercial point of view. The table showing the trade names, and the scientific designations of the several gems, is very complete; and the whole work may be commended for its union of scientific accuracy with practical usefulness.

NOTES.

THE International Sanitary Conference, which was to have opened at Paris on January 24, has been postponed to February 7. We learn that President Cleveland has appointed Dr. Edward S. Shakespeare, of Philadelphia, Dr. Stephen Smith, of New York, and Dr. Preston H. Bailhache, of the United States Marine Hospital Service, delegates to represent the United States at the Congress.

A SLIGHT earthquake visited North Devon about 9 a.m. on Tuesday, January 23. The shock seems to have been felt over the whole of Exmoor as far as South Molton.

WE regret to note the death of Prof. A. Hirsch; he died at Berlin on January 28, at the age of seventy-six. We have also to announce the death of Dr. G. Adler, Professor of Mathematical Physics in Vienna University.

DR. K. VON ZITTEL, Professor of Geology in Munich University, has been made a member of the German Privy Council.

AT a public meeting held at Shrewsbury on Tuesday, it was resolved to raise a memorial to Charles Darwin, who was a native of that town. Another public meeting will be held to consider the best method of carrying out the proposal. The Mayor of Shrewsbury, in commenting upon the proposal, rightly remarked that in doing honour to one who had shed an imperishable lustre on his native town they were doing honour to themselves. In addition to the suggestion that a bronze statue of Darwin should be erected in front of the old Grammar School, now the public library and museum, it was proposed to found a scholarship to his memory in connection with Shrewsbury School. Another suggestion was that the memorial should take the form of a hall of science to be erected in Shrewsbury for the purposes of scientific and technical instruction.

IT is reported that a sum approaching £50,000 has been bequeathed by the late Mr. T. H. Adam, of Newport, for the purposes of technical instruction. The money is to be devoted to teaching practical and theoretical agriculture to men and youths, and a knowledge of dairying, housekeeping, and other subjects to women and girls, either by means of lectures or the establishment of a school or schools of agriculture at Edgmond or Woodseaves, in Shropshire, or Chadwell, in Staffordshire, or elsewhere; or by such other means as the trustees shall think fit.

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[1] "Edelsteinkunde: Bestimmung und Unterscheidung der Edelsteine und Schmucksteine. Die Künustliche Darstellung der Edelsteine." Von Dr. C. Doelter, o ö Prof. der Mineralogie an der K.K. Universität Graz. (Leipzig: Ve and Co., 1893.)

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